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# Meeting Online to Reduce Carbon Emissions and to Emphasise Values in Life and at Work

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**Abstract:** In today's media, we often read about how much energy digital services consume, with streaming services, such as Netflix, and social media hosting, such as Facebook, in the spotlight. Though these are certainly serious issues that we as a society must address, there are also opportunities for using digital and online technologies to help organisations respond to the sustainability imperative by reducing their carbon footprints. For example, as researchers working with online leadership, collaboration and learning, we often hear organisations address the need for meeting online from a cost-effective perspective, such as reducing travelling costs, reducing time spent on meetings and reducing the necessary preparation time. Though we do not generally disagree with this practice, we find that a similar perspective regarding environmental issues could prove beneficial, shifting the focus from a time and cost-effective ideal to a new value-driven perspective on life and work. Thus, the questions become how can we use digital services, such as online video conferencing, to yield meaningful results for the organisation and the environment and how can we create organisational incentives to identify and apply these online alternatives to benefit the organisation and society at large. This may also provide a new set of dynamics for motivating employees, students and others to partake in such digitalisation strategies if they are associated with concern for the environment. In this paper, we address in more detail the arguments for a sustainability perspective to online leadership, collaboration and learning rooted in the literature and the daily news, and we discuss cases from our own settings to provide suggestions for working with the positively charged concept of Environmental Conversion Value; however, this remains a complex arena with multiple considerations and concerns.

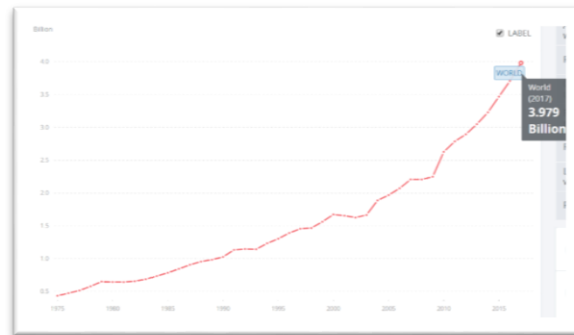
**Keywords:** video conference, carbon emissions, online activities, environment, sustainability

## 1. Introduction

According to the United Nations (2019), 'Climate Change is the defining issue of our time and we are at a defining moment'. The main cause of climate change and global warming is greenhouse gas (GHG) emissions: 'Over the past 10 years, the energy sector has remained the largest contributor to emissions over any other sector, representing 72 percent of global emissions in 2013' (Friedrich, Ge and Pickens, 2017). According to the United States Environmental Protection Agency transportation, including business trips, caused 29% of GHG emissions in 2017, and electricity caused 28% (EPA 2019). Large corporations' worldwide have committed to reduce GHG emissions, with incentives, such as the recent Climate Action 100+, promoting community and individual commitment to reduce emissions (Climate Action, 2019). However, the drive towards globalisation in the private and public sectors, as well as in domestic leisure time, has created a significant rise in travel, including air travel (see Figure 1). Travelling for collaboration, learning and governance can be essential, yet the brief note on the CO<sub>2</sub> cost at the bottom of the flight ticket is proof of the negative environmental imprint, which counteracts the espoused environmental concerns.

A large number of studies and papers in the general media landscape work on when, where and how a technologically supported initiative, such as videoconferencing, may work as a substitute and, thus, a greener solution (e.g. Julsrud, Hjorthol and Denstadli, 2012; Lindeblad et al., 2016; Ong, Moors and Sivaraman, 2014; Poom, Orru and Ahas, 2017). However, as previously mentioned, energy consumption is another significant factor for GHG emissions; thus, technological energy consumption and other factors related to video conferencing must be considered. In a paper comparing the energy, carbon and time costs of videoconferencing and in-person meetings, Ong, Moors and Sivaraman (2014) provided an impressive all-inclusive calculation, showing that not only is the energy consumption when using videoconferencing software and technologies high, but that the devices production and life-span issues (including the devices used by the meeting participants—computers, mobile phones, screens and LAN/Wi-Fi services, as well as the servers hosting the meeting, the software, etc.) all contribute significantly to this calculus. However, Ong, Moors and Sivaraman (2014) only considered the marginal costs, as devices are used for many other things in a lifespan. In their estimation of how

videoconferencing compared to travel, they not only considered air travel but also train and car travel, and the estimate was based on various distances (Ong, Moors and Sivaraman, 2014). Ong, Moors and Sivaraman (2014) concluded that video conferencing consumes approximately 7% of the energy/carbon of an in-person meeting, taking into account the variations in distance travelled, meeting duration and technologies used. However, they also argued that video communication potentially has a lower efficacy, as it could take longer to achieve the same outcome in a video conference as compared to an in-person meeting, and they referred to other studies that found many perceive video conferences as being less effective, as groups working at a distance experience weaker social ties and less co-presence between participants (Ong, Moors and Sivaraman, 2014, p. 90).



**Figure 1:** Number of air travel passengers (domestic and international) 1975–2017 (source: <https://data.worldbank.org/indicator/IS.AIR.PSGR?end=2017&start=1975&view=chart>)

Other research studies have investigated broader perspectives concerning environmentally sustainable solutions. In addition to reducing GHG, these studies have also explored videoconferencing for supporting such issues as increased social and personal wellbeing, equity and democracy. For example, videoconferencing provides the possibility to interact with war-torn locations, politically unstable territories or environmental catastrophes, gives people equal access to knowledgeable experts, provides people with disabilities or other challenges the possibility to work, presents people's views even if they are not physically or psychologically able to participate in person or simply provides a better quality of life and less polluted cities for those who spend extensive time commuting (e.g. Akbari and Hopkins, 2019; Mark and Semaan, 2008; McWhorter, Robers and Mancuso, 2014).

In this position paper, we take a point of departure from the perspective, which is also shown in the above studies, that videoconferencing is a carbon-effective choice. We are certainly not on a mission to bring 'flight shame' to new levels. There can be good and profound reasons for traveling. Rather, we want to elaborate on, and if not disprove then at least nuance, the claim that videoconferencing is less effective than face-to-face meetings and activities. We also discuss some of the obstacles on an organisational/management and personal level. Just as there are many factors that interplay with the energy consumption of video conferences, there are many factors that influence how this meeting form impacts the organisational and the personal levels when it comes to online leadership, collaboration and learning. Consequently, we methodologically applied both a discussion of the existing literature and explore the identified factors via examples from our own research practice. In our qualitative literature review process, we found it difficult to determine appropriate search strings/keywords. Researchers apply various terms in these discussions, such as climate, carbon footprint and carbon emission, green technology, sustainability, etc. We found that within our research scope of online work and meetings and videoconferencing, carbon emission is a common term; however, we used word combinations in our searches. We searched systematically using ProQuest and Google Scholar, and from these results we selected relevant papers, primarily using a forward snowballing process and focusing on relatively new literature (10–12 years). Our analyses of the papers were listed in logs containing the papers' relevant information. To further ground the findings in relation to how online meetings can support qualitative values in life and at work, we turned to findings from one of our own researches that relates to the field of collaboration and pedagogical perspectives around videoconferencing at Aalborg University, which mainly studied larger campus-to-campus teaching but also included smaller-scale supervision and meetings. The investigation took place over a couple of years and was completed in 2017 (Ørngreen and Henningsen, 2017). Researchers/teachers, students and study board members were interviewed, some through workshops/focus groups; teachings and meetings were observed, and two surveys, one among staff and students (with 1843 respondents in the winter of 2015/16) and one among students (with 345 answers from the spring of 2017), were conducted. We ended this paper with a

suggestion to investigate online meetings in a more positively charged argumentation form through the introduction of what we call the Environmental Conversion Value.

## **2. Videoconferencing for leadership, collaboration and learning**

There is a substantial body of literature on videoconferencing in the public sector, such as from the higher educational arena, as research work and teaching via video, or from the health sector's use of videoconferencing in a learning and communication perspective, as in telemedicine, online patient support and online knowledge sharing networks. The previously mentioned Ong, Moors and Sivaraman (2014) study detailed abstract calculations and lacked some of the concreteness of actual practices in the specific domains, in this case eLearning, eCollaboration and eLeadership. A survey at the South West Wales Cancer Network showed that videoconferencing saved substantially on carbon and travel costs (Lewis, Tranter and Axford, 2009). In 2006, 60 people attended 21 meetings, saved 18,000 km of car travel and £4400 in travelling expenses, equivalent to 1696 kg of CO<sub>2</sub> emissions (Lewis, Tranter and Axford, 2009). In 2007, these numbers increased to 90 people, 30 meetings, saving 20,800 km in car travel, £5100 in travelling expenses and 2590 kg of CO<sub>2</sub> emissions (Lewis, Tranter and Axford, 2009). From the paper, it is impossible to determine if the increased use was due to a governmental or management decision or to the people who used it finding it effective; however, given the technological development at the time, the fact they made videoconferencing work and spread seems to indicate there was an organisational learning process occurring.

In this domain, travels have often been discussed from a cost-effective perspective. As this paper's introduction established, videoconferencing produces fewer carbon emissions; however, there is some reluctance to claim videoconferences themselves effective, then cost-effective studies are also relevant to consider, if the concept of effectiveness, includes investigating the quality of, how well the video conference performs, as opposed to only how much money is saved. In a new study, Buvik et al. (2019) investigated cost-effectiveness in remote orthopaedic consultations in northern Norway through randomised controlled trials and found that the video-assisted consultations taking place between a remote clinic in northern Norway and a hospital 148 km away were cost-effective from both a societal and a health sector perspective. Furthermore, when they examined other studies in the same area, they found the works 'reported a reduction in the number of referrals to the specialist because of a learning effect' (Buvik et al., 2019, p. 11).

Another way of considering impact is by evaluating if the current travel practice adds value. For example, a study of air travel practises at the University of British Columbia used publicly available information about the length and number of travels made versus academic positions held, salaries, gender and publication h-index (Wynes et al., 2019). The authors found that travels were unrelated to academic productivity (h-index) and that academics with more seniority and higher salaries took more flights (Wynes et al., 2019). Though there are of course variations in the study and interpretations to discuss, the results are interesting in relation to today's public media debate: the researchers' noted there was a self-perception, then in order to do one's work well, there is a need to travel, to sustain high research productivity, to maintain and create research collaborations, to perform field work and to physically participate in networking/conferences. While perhaps a small percentage of travels supports this notion, many travels do not, and this could be relevant to investigate, though also difficult due to the numerous influential factors. It is also noteworthy that Lindeblad et al (2016) in their review on organisational effects of videoconferencing (or what they call virtual meetings), they showed that video conference meetings may in fact also have the opposite effect, namely that online meetings may enable people over larger distances to work together and, thus, increase the number of collaborations, but then also sparking the need to have in-person meetings as well.

In public and highly regulated institutions, such as learning institutions and universities, policies often govern actions. In an investigation at the policy level of Australian universities, Glover, Strengers and Lewis (2018) found that the university's environmental sustainability goals often relate to green solutions, including green technologies, with the strategic areas of recycling and reducing water and electricity consumption on campus. Such initiatives were part of almost all the Australian universities' policies. However, in relation to travel, they identified three groups. The first group was 'Air Travel Ignorers', who have no sustainability policy nor recognised air travel as a source of greenhouse gas emissions (this was the case in 23 out of the 43 Australian universities [53%]; Glover, Strengers and Lewis, 2018). The second group was 'Recognition without Intervention', who mentioned carbon footprint in relation to air travel but offered no actions for how to reduce it (seven universities

were in this category; Glover, Strengers and Lewis, 2018). The third group, known as 'Air Travel Substituters', had a strategy for how to substitute (Glover, Strengers and Lewis, 2018).

Lindeblad et al. (2016) conducted an empirical work that concentrated on interviews and a survey with people from Swedish public agencies at the national level, which have many similarities to knowledge organisations in the private sector. The analysis confirmed previous works that showed virtual meetings change the organisational structure in positive ways: they can increase the frequency of communication, change work processes, provide flexibility, better use skills and expertise and involve co-workers and external resources at multiple locations (Lindeblad et al., 2016). However, the interviews revealed that virtual meetings can be a challenge for managers and people in leadership positions, as it is difficult to oversee and follow up on work and to handle conflicts, personnel and personal matters (Lindeblad et al., 2016). The survey asked 493 respondents if the use of online meetings influenced their productivity at work, and 78% agreed fully or to some extent that this is the case; however, the interviews also showed some found it less efficient, as there is a risk of misunderstandings, unfairness, cultural considerations and technical hassle (Lindeblad et al., 2016).

Regarding leadership, it has been established that leaders have an essential role in promoting the transition to online mediated working habits, and they influence the way other organisational members perceive technology (Avolio et al., 2014; Lindeblad et al., 2016; Van Heck, 2012). Technology has also influenced leadership. Social, mobile and networking technologies have created distributed and two-way leadership styles, enabling members of a virtual group to display transformative leadership qualities when performing collaboratively towards a common objective (Avolio et al., 2014). On a similar note, Lindeblad et al. (2016), with reference to the work of Wallström, noted that technologies also change individuals' perceptions about meetings, from meetings as isolated events in time and space to meetings that are a continuous, asynchronous sharing of work.

However, not every organisation works this way. In addressing the imperative to take action regarding today's environmental demands by making global operations more green, Colfax et al. (2009) stressed the need to adopt and expand online leadership and communication and to use virtual teams, thus transitioning to a new virtual organisational management paradigm. This requires a sustained effort to train managers on e-leadership skills, including the means to build trust and to promote effective communication and mutual commitment among team members. In terms of leadership styles in an online environment, Hambleya, O'Neil and Kline (2006) studied elements of transactional and transformational leadership online and concluded there were no significant differences from leading face-to-face, as long as managers employed effective communication media to ensure team cohesion and collaboration. Dasgupta (2011) referred to a study by Purvanovaa and Bono that stated transformational leadership is more effective, with virtual teams leading to high performativity. This might indicate that, in the absence of physical interaction, leadership and collaboration can potentially focus on the task itself rather than interpersonal dynamics, which may play a bigger role in face-to-face collaboration. However, some of the participants interviewed in the Lindeblad et al. (2016) study mentioned it was difficult to 'read' interpersonal relations and dynamics when leading a group in online settings, which again illustrates the necessity for having competences to navigate videoconferencing settings.

Some of the central conditions for making online leadership work require promoting effective communication, building trust to and among organisational members, creating presence and enthusiasm, mentoring and monitoring employee performance, ensuring a lack of technological competence does not affect performance and helping members maintain work-life balance in a ubiquitously connected paradigm (DasGupta, 2011).

### **3. Samples of experiences from our own research practices**

In our research project introduced earlier that focused on the pedagogical issues related to videoconferencing at Aalborg University in Denmark (Ørngreen and Henningsen, 2017), we explored the challenges and ways forward.

Our study identified that the users, in this case teachers and students, experienced effectiveness and satisfaction around smaller-scale online teaching and collaboration setups. For example, both educators and students favoured one-on-one supervision, as the students expressed that these one-on-one online dialogue strengthen their relationship with the supervisor because they feel they are explicitly 'talked to'. The teachers also expressed that one-on-one online supervision provides flexibility for shorter and more frequent meetings with students and colleagues. Furthermore, our study identified that the distributed online teaching and meeting

platforms in which participants are represented via a small video of their upper body and face was pinpointed as a good for online communication. Some students stated that they would prefer this type of online meeting because they experienced equal access to the teacher, and the educators found that some students who normally do not engage in dialogues are more willingly involved.

In relation to larger-scale, campus-to-campus teaching setups, the students in our study expressed a motivation towards experiencing and training in these situations because they expected their future work life to include similar setups. The students also pointed to the potential to access experts with specific academic knowledge, as well as the flexibility to access teaching sessions when not being physically on campus.

Challenges were also pinpointed. Some students found that the teachers, when practicing in these large-scale, campus-to-campus setups, lacked pedagogical competencies, which caused the students feeling being put into a passive TV-watching mode, making them feel uninvolved and unengaged. The teachers expressed a similar lack of pedagogical competences and a lack of tools to navigate these (for them sometimes unknown) campus-to-campus online learning setups. These results indicate the need for competence development among the teachers in these online teaching settings with larger groups of students positioned in different locations.

Some teachers also expressed a resistance towards using campus-to-campus teaching setups due to a top-down agenda from management to use videoconferencing, due to technical obstacles and an experience of feeling restricted in their pedagogical space. Among some teachers, this created the narrative that teaching campus-to-campus through videoconferencing was troublesome. Various initiatives were implemented in the organisation to twist this internal narrative, such as highlighting smaller successes as possible trails for teachers and students towards new narratives and offering workshop-based courses focusing on pedagogical opportunities in campus-to-campus setups among teachers.

We want to emphasise that the concern for environmental issues could potentially motivate staff members to rethink the negative narratives around campus-to-campus videoconferencing and thereby potentially be motivated to develop their technical and pedagogical toolbox. In Denmark, concern for environmental issues and sustainability perspectives among staff and students is increasing at universities and in society in general (Minter, 2018). Particularly within the last two years (2017–2019), a growing number of educators, students and in some levels of management has advocated for environmentally sustainable strategies concerning travelling and waste sorting at Aalborg University. New committees at different organisational levels have been established to focus on green and environmental initiatives. So, there is potential for a new dynamic to motivate members of the work community to partake in digitalisation strategies once these strategies are linked and associated with environmental concern, a possible green workplace and a personal value for the employees. Similarly, Van Heck et al. (2012) found that knowledge workers' mindsets tend to be more inclined towards the value-adding aspects of work.

As could be seen from the literature (e.g. Avolio et al., 2014; Lindeblad et al, 2016) technology impacts the ways we perform leadership, collaboration and learning, thus changing the structural conditions of organisations. In our research, we have seen how everyday practice in the public and private sectors has progressed from thinking of working in person or online to hybrid cultures. Hybrid in the sense that there are varied forms of participation. Some connect by meeting a couple of persons at a local base, while others connect from a desktop in their home or via mobile devices while on the go; however, all participate in the same online meeting. Some individuals may be simultaneously working on one document, while others are sharing a drawing pad or writing their own personal notes. Some individuals may be connecting using company-dedicated software, while others connect via their own personal devices (BYOD).

However, even if there is an increased awareness on academics' travel practice for their research collaborations and for teaching at different campuses, for such cultures to change, it may be vital that management support these changes with visible initiatives, as e.g. the policy level by being an "Air Travel Substituter" (Glover, Strengers and Lewis, 2018), both in respect to choosing greener travel solutions and to choosing to support video conference modes. In our department, we manage work, lead personnel, collaborate and teach/learn online. However, many programmes at the university level do not have a specific department policy or study regulation that supports this practice, and many of the arguments behind this concern cost-effectiveness. This low adoption rate is not necessarily due to the nature of the work tasks themselves but to managerial decisions. Today, many employees would like to choose more sustainable solutions if they are supported by management and if they

factor in both the carbon emission perspective as well as the organisational and personal impacts such choices can have, such as the effect on work/life quality and productivity.

#### **4. Proposal and discussion – the environmental conversion value (ECV)**

We would at this stage like to advance the argument for building an environmentally sustainable rationale by introducing the notion of a positively charged Environmental Conversion Value (ECV) when opting for an environmentally friendly online working solution, as opposed to the negative conditioning of increasing the carbon imprint and, thus, the consequences of not choosing otherwise. We claim that ECV presents certain invitational qualities when considering viable solutions to supporting electronically mediated leadership, collaboration and learning by enlarging the efficiency rationale to include a sustainability perspective into the digitalisation strategy.

Much has been said about maintaining the life-work balance, particularly for knowledge workers in high-performance work environments (e.g. Akbari and Hopkins, 2019; Barratt, Millar and Bristow, 2015). A different approach is to emphasise important life values at work in the form of motivating incentives that energise and inspire employees. The pervasiveness of climate concerns has given rise to various corporate responsibility initiatives, which send reassuring signals to the surrounding society. However, there is an increasing potential in disseminating the corporate responsibility inside organisations by cultivating a bottom-up approach to empower the workforce towards more sustainable work methods. Van Heck et al. (2012) argued this may be particularly important for knowledge workers, who tend to be more inclined towards the value-adding aspects of work, in this case supporting more climate-friendly initiatives. Reporting on the integration of various technologies to create a mobile and green high-performance workplace, the authors stressed the importance of launching an organisation-wide change incentive, which combines top-down vision in the form of direct engagement of the CEO with bottom-up engagement by respected members of the work community (Van Heck et al., 2012). It is equally necessary to invite and process the challenges encountered by the employees as they transition into a green high-performance workplace. While mobile communication technologies are crucial in diminishing travelling and commuting, they also alter the way people work. Therefore, the change processes involved refer as much to a change of mindset as to the reorganisation of work.

Ruepert et al. (2016) have proposed a value-identity-norms model, according to which values, as biospheric values, that reflect general concerns about the environment, are reflected in certain identity beliefs, in the form of an environmental self-identity. The intention is to support personal norms, to act pro-environmentally. The authors define pro-environmental behaviour as a set of behaviours that harm the environment as little as possible or even benefit it (p.6). The authors envision three areas of concern, when it comes to increasing environmentally friendly affordances in organizations, i.e. “facilitate or at least not inhibit pro-environmental behaviour” (p.7). The first is related to the lack of autonomy of employees to make such choices; and hence the need to increase employee autonomy to act according to their values and norms. The second area of concern is with the economic profitability, which is ruling principle in many organizations, and may therefore inhibit pro-environmental behaviour, if this delays or reduces profitability. Finally, the authors point at the reduced self-control of employees associated with sustained periods of cognitive overload, which may limit employee surplus in terms of considering pro-environmental alternatives to routine ways of managing workload. Arguably, making environmental gains more visible through a calculation of ECV, that have a positive connotation, each time organizational members succeed in choosing an environmentally friendly alternative, might have a motivating effect on employees, gradually expanding pro-environmental behaviors in organizations. It might, on the one hand, afford individual members more autonomy, and on the other provide a more visible argument against the economic rationale. A visible ECV might have an appeasing effect in situations of cognitive overload, but could also, on a more critical note, be perceived as ‘yet another performance-monitoring’ tool at work. So whether this is ultimately designed as a tool for discussion or something that is measured throughout the organisation at individual level, needs more research.

Greening the workplace is ultimately relying of each single employee making up their mind to contribute in any way possible to reduce the carbon footprint and the various types of waste at work and elsewhere. It has been suggested that such strategic initiatives can only be implemented in holistic ways, as they depend on the active support of the individual employees (Süßbauer and Schäfer, 2019). Sustainable behaviour in the workplace must be embedded in various social practices to promote waste prevention and to reduce the energy use and environmental strain caused by commuting and travelling. Organisations that provide specific enabling

structures, ranging from identifying opportunities, providing space for experimentation and stabilisation and encouraging participation, do indeed transform organisational practice. The holistic, coherent type of organisational greening incentives show increased satisfaction among employees, particularly when combined with participatory or coaching leadership styles, which makes employees feel their ideas are more appreciated (Süßbauer & Schäfer, 2019; Van Heck, 2012).

Certainly, an approach that factors in quality of life and work perspective makes it possible for employees to choose such options, not only in long-distance meetings but also on an everyday basis, when it is a meaningful choice. However, Akbari and Hopkins (2019) emphasised that it is ultimately a management issue to provide such possibilities. The authors conducted a survey in Ho Chi Minh City with 200 employees across sectors, and 74% of commuters wanted the possibility of anywhere working practices but only 41% were permitted, and interestingly 29% did not know if they were allowed to work in this way (Akbari and Hopkins, 2019).

The notion of quality of life at work fits with the notion of extending a more sustainable lifestyle across the boundary between the private domain and work. Arguably, this pro-environmental behaviour at work contributes to raising the perception of quality at, and likely of, work. In this perspective, replacing travelling and commuting with technology-mediated work activities would add value and act as an incentive to increase the quality of working online. The discussion seeks to transcend the economic rationale for the online conversion of work activities to include employee wellbeing and social sustainability. Therefore, it is not our intention to suggest that people should never meet, nor move out of their own spheres; rather, our position is to reduce unnecessary travel when there is no immediately positive gain from travelling, perhaps creating a more positive work-life balance and quality of work.

## **5. Conclusions**

Meetings online are associated with cost-effective ways to manage collaboration and learning across locations. Arguably, IT and various collaborative software make it possible to move beyond a mere economic incentive and to implement an intentionally sustainable strategy for an online meeting culture that is more environmentally sustainable, initiated both at the employee and management levels. Through this position paper, we aim to encourage employees and management towards pro-environmental conscious actions that include life and work factors and consider to develop these practices into an explicit repertoire for the organisation.

Our research, presented in this paper, argues that online work and collaborations over distance (globally and locally) are potentially more effective than in-person meetings. However, in our experience, there is a need for organisations to establish 'good experiences', required competences and cultural and policy-level support systems.

This results in a set of considerations formulated as a suggestion towards working with the positively charged concept of Environmental Conversion Value (ECV); however, this remains a complex arena, with multiple considerations and concerns. ECV would be an expression of the extra value gained from reducing travelling and supporting a beneficial work-life balance. Future research will entail identifying the technological and pedagogical affordances for transforming the perception of presence and work in distributed collaborative settings and determining meaningful ways of working with ECV at the organisational and personal levels in life and at work.

We find that it is not always a straightforward equation to think in terms of digital sustainable measures; however, this is something we need to do. As researchers in digital processes, we contribute to how we understand and develop the implementation and operationalisation of online meetings, which reduce carbon emissions and emphasise the values in life and at work.

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